# THE NEON NEWS

A JOURNAL OF MANIFOLD DESTINY

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## Single-electrode tubes

*Editor's note: Seattle's Peter David is well known for his unusual sculptures (see Signs of the Times 9/88 and 9/89) that push the limits of what a piece of gas-filled glass can do.*

*He learned neon by 1) finding and reading Sam Miller's book in a library (in the reference section; he couldn't even take it home) and 2) buying some boxes of very old, very dirty equipment, cleaning it at a car wash, and then figuring out bit-by-bit how to assemble it. So I have the utmost respect for him; that's a hard route to go.*

*I was able to visit his studio this summer, poking around and asking questions for several hours. As someone working the fringes of the craft he naturally had a lot of unusual equipment and sources and techniques, which we're pleased to feature here.*

*This "bombarding oven" is especially nice in that it raises and lowers over his regular bombarding table, making the manifold connections simple. One tip he mentioned when showing me this equipment: he keeps a hair dryer handy for slowly pre-heating pieces "where you just know it wants to crack."*

*Elsewhere in this issue are some of his "unusual products" sources and an article (by Ted) based on his saltwater bombarding choke.*

By Peter David

It seems to be the latest and the greatest, this single-ended tube thing, but actually it's as old as Geissler tubes and Tesla's early plasma tubes.

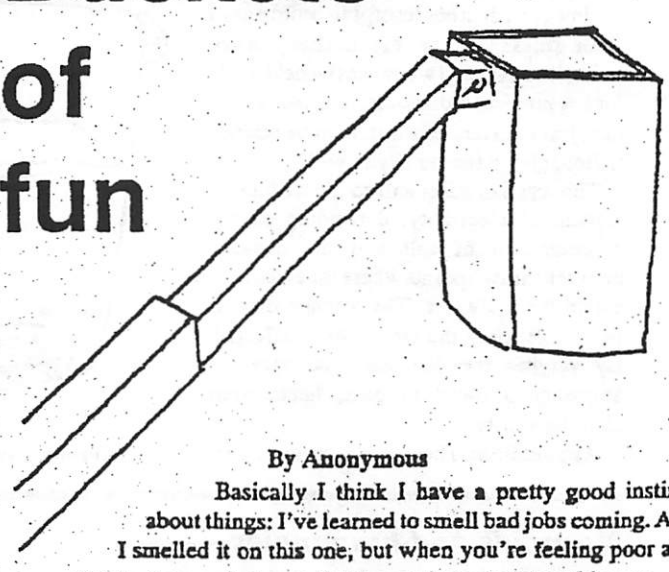
The obvious advantage to this type of tube is its aesthetic appeal. Making tubes that are not limited to the 'straight-through' format of normal core-and-coil-type installations is fun and offers almost endless possibilities of form.

But as the old saying goes, form must follow function. So, how to make single-ended tubes that function?

When I made my first bonsai trees in the single-ended form, I came to the obvious problem of how to bombard them. Without two electrodes, how

(see Single-electrode, page 14)

## Buckets of fun



By Anonymous

Basically I think I have a pretty good instinct about things: I've learned to smell bad jobs coming. And I smelled it on this one, but when you're feeling poor and kinda desperate for work it's amazing what you'll ignore.

"Can you come repair our sign? Uh, yes, it's up high. Real high." It had a projecting, angled roof underneath the letters — no way to get up there with a ladder, and the angle was too steep to walk on.

So I called for boom truck prices. $75 per hour, with a minimum of four hours, operator included. Hadn't done boom truck work before, but I booked it anyway.

So oh boy — this faint scent of nightmare was getting stronger.

The day came and I was up at 5, drove the 45 minutes to the site. I hate having to be this focused at 6 in the morning.

The store manager said the store opens at seven. I said "seven? You sure?" he said yes, seven. I ran through the plan in my head: I'll set up inside then so when the truck comes at 8 I can immediately get to work out front.

The sign's about 30 to 35 feet up; they said the boom truck will reach to 50 feet, so no problem. I'll go up and pull the faces off the two bad letters, and pull out the glass if it's bad. Drive back home with it, re-pump it, drive back: done.

The mall lot was empty, lights out, doors locked and no one in sight. Peered through the glass, walked around the building, cursed softly,

(see Job from hell, page 6)

# Buckets of salt: Cook up a cheap choke

If you are quite comfortable with the idea of sticking a live 220-volt wire into a bucket of saltwater, read on.

This fall I needed a second choke and I remembered reading in Signs of the Times several years ago about Dean Blazek's visit to Peter David's neon studio in Seattle, and his comments on an unusual type of choke he saw there: a "pickle barrel" as he called it.

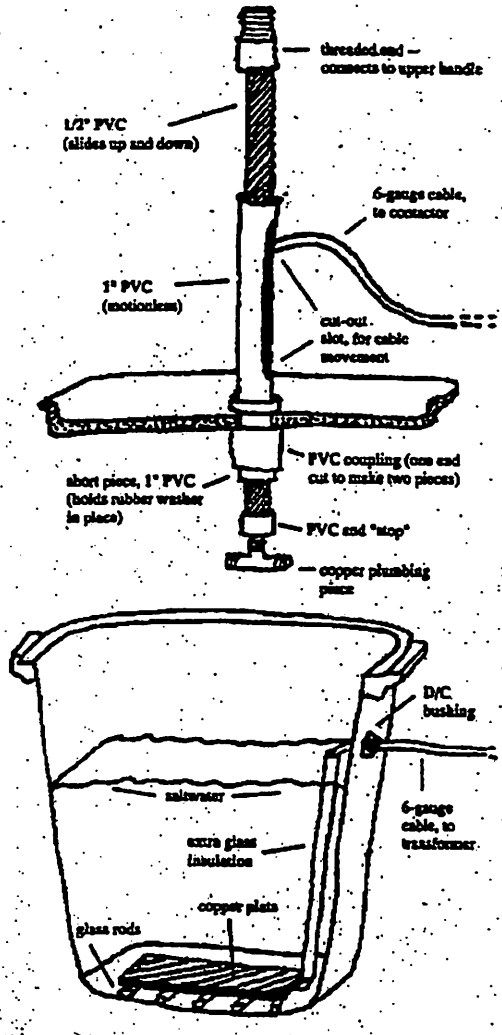
I called Peter to ask for details. What he told me over the phone was a basic outline of what's needed, and then I took it from there and built my own.

These are useful in several ways: as a stand-alone choke, and also as a "fixed position" second choke (wired in series with an existing choke, to drop the range down). Another use, in a "fixed position" manner, is to stop the initial surge that you get when you use a "Chokemaster"-type choke on a powerline transformer (no more blasting the milliampmeter gauge).

However, do not attempt to build one of these unless you are certain that you are doing it safely, and we cannot be held liable for any problems, disasters, lost pets, etc. In fact, just consider this article to be science fiction, choke fiction if you will.

**Theory:** Saltwater will conduct a limited amount of electricity, depending on the concentration of salt and the distance between the two points where the electricity enters the saltwater. The voltage drop is negligible; only the amperage is affected. By varying the distance, you vary the amperage allowed to pass, hence your choking ability.

**Application:** These units generate heat


threaded end — connects to upper handle
1/2" PVC (slides up and down)
6-gauge cable, to contactor
1" PVC (motionless)
cut-out slot, for cable movement
PVC coupling (one end cut to make two pieces)
short piece, 1" PVC (holds rubber washer in place)
PVC end "stop"
copper plumbing piece
D/C bushing
saltwater
6-gauge cable, to transformer
extra glass insulation
copper plate
glass rods

*Cut-away view of 8-gallon plastic bucket*

—in a first-try mock-up I used only 2" PVC piping to house the whole thing, and while it choked just fine, at one point the saltwater boiled and popped out rather rapidly ("exploded" would be too strong a word, "overflowed" too mild). This is yet another reason why a both-hand-activated bombarding trigger is something I'll always stress to others — without a system that shut off so quick, you might have a new editor. See Neon News #2, page 5, for details.

So the need is for enough saltwater to absorb the heat, and a method of moving the upper conductor closer-to and further-from the fixed-position bottom conductor.

And you need to have it all safely contained, preferably in such a way that evaporation is minimal (evaporation will change the salinity and therefore the effect of the choke). The range of motion needed is about 12 to 16 inches.

A confession here: I built mine with only 7" of motion, which is OK for "fixed position" / second choke use (a range of about 500 milliamps), but not enough for stand-alone use. So I cannot tell you exact dimensions for that — I'm assuming that 12 to 16 inches is enough.

Peter said that he'd heard of elaborate setups with cranks and pulleys for lifting/lowering, but his was just a hand-adjusted rod, with a spring-clamp to hold it in any given

**(see Choke, page 8)**

## *Neonoids and humanoids —*

*We're wondering what form of life we are these days, as always-damp Hilo's wettest year comes to an end with over 210 inches of rain. (A wet year in Seattle is 60 inches; sunny Honolulu has counted only 20.) We're trying real hard not to go crazy, and talking with Neon News people is our medicine for cabin fever. Keep in touch, please.*

*Aside from the raindrops, we're making a little splash in the big world. Reviewed as one of five "publisher's choices" (along with Diseased Pariah News and Paranoid Tales of Neurosis!) in Factsheet Five's "zine" review, we have heard from some interesting folks. Between trying to reach more neon shops through friendly sign supply companies, and your word-of-mouth help, we hope to keep growing —another few subs and we'll take baby out to dinner to celebrate. (But just to some Hawaiian plate-lunch dive where everything comes with two scoops of rice and gooey macaroni salad.)*

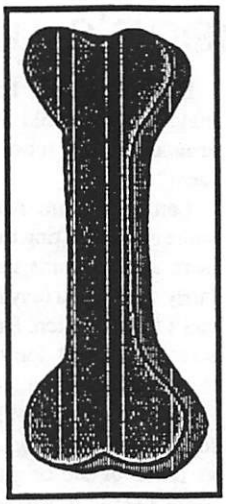
*We take baby out to eat because we take him everywhere, and that includes days in the neon shop. So you can expect more coverage of health issues, particularly since high-voltage electric hazards are becoming big news. Right now the Bush administration is so freaked out by its own research on this that the report's release is being delayed. Word is that powerlines are linked to childhood leukemia and other bad stuff. If this reflects on the safety of powerline/bombarding transformers, maybe there's no way to "childproof" neon shops, and maybe pregnant benders better leave bombarding to someone else. Puts a chill down our spines ... so we'll sort it all out and pass on the word about safer shops for everyone.*

*We welcome more new contributors —Phil Baker, daytime chemical engineer and nighttime bender; Peter David, always up to something interesting; Michael Blazek, our south-of-the-equator correspondent, and Len Davidson, keeping Philadelphia alight.*

*May your New Year be peaceful and mercury-stain-free —*

Ted + Val

# 'Dog bones' and sacred cows:



*Editors' note: As we stood on the deck of Chicago's Sears Tower it looked like an interesting bit of neon far below us, gathering brightness as the equally red sun set through the smog. So we headed over to the rubble-strewn lot that was serving as a city-sponsored sculpture garden to check it out.*

*And we gasped. And giggled. And couldn't quite believe what we saw: Huge animated neon-red dancing penis figures, one bowing and doffing its hat, against a metal background of varied designs.*

*(By day—we returned the following day to look again — these "controversial" neon parts of the sculpture completely disappear into a background of other sculptural elements.)*

*Whoo-ee, we marveled: How did this piece escape censorship by the city fathers?*

*As it turned out, it hadn't in its earlier home of Buffalo, New York. The sculpture, titled "Green Lightning," has been the subject of a legal (and, at times, physical) battle between the city and artist Billie Lawless that has lasted six years.*

*And another Lawless sculpture, "Didy Wah Didy / Atomic Playground," which featured illuminated images of nuclear disaster, was chased out of Columbus, Ohio, months ahead of its scheduled departure.*

*We've been searching for Lawless to get more information ever since we started The Neon News. None of our neon contacts seem to know where he is, so our next step was calling the Buffalo News and convincing the librarian to send us all the Lawless stories. Here are some highlights:*

**Nov. 16, 1984:** "The controversy began shortly after 5 p.m. Thursday when Mr. Lawless and about 30 others gathered along the arterial to dedicate his $80,000 work, which was financed by about 75 private donors, ranging from 'the area's largest corporation to individuals,' according to Mr. Lawless...

"When the panels that Mr. Lawless and associate Kathy Simonds have been working on for more than two years were illuminated, police at the scene to help direct traffic registered their 'shock' at what the panels revealed.

" 'To my shock, I did not observe a multicolor artwork, but four neon objects resembling male genitals...' said Lt. William P. Conwall... (He said) traffic 'came to a crawl' as motorists viewed the lighted neon sculpture.

"Mr. Lawless ... called it a 'graffiti image' based on graffiti that adorned the side of a Bailey Avenue building for years and was deemed 'harmless' by all who viewed it.

" 'People's interpretation is up to them,' he said today. 'Perhaps it has something to do with their minds.'

"...He also vehemently denied that any of the figures should be viewed as a sex organ. 'It can be viewed as other objects as well... It just depends on where you're coming from.'...

"While Mr. Lawless contends that the sculpture has been approved and supported by various city agencies from the beginning, city officials contend they were 'duped.'

" 'There is a general consensus that the model actually approved did not fully indicate the suggestive nature of the piece now installed' (said one official)...

" 'People have been offended by art for thousands of years,' Lawless said. 'What can I say?' "

# On the trail of neon outlaw Billie Lawless

**Nov. 20:** "Some city officials say they are convinced that sculptor Billie Lawless pulled a giant hoax on Buffalo by including neon depictions of male genitals in his work 'Green Lightning' along the busy Elm-Oak corridor downtown.

"They dismiss the artist's assertions that the neon represents 'an abstracted dancing figure celebrating life' and say Mr. Lawless misled them...

"The final neon was not added to the sculpture, city officials say, until the day before last week's dedication of the sculpture.

" 'Obviously, we feel let down,' (one official) said. 'We feel the model showed one thing and we got a lot more than we bargained for, a lot more than we bargained for.' "

**Nov. 21:** "A wrecking crew, working in the darkness with cutting torches, partially dismantled the controversial 'Green Lightning' sculpture Tuesday night before a court order halted the work...

"At that point, one panel had been taken down from the billboard-like frame and loaded on a truck. Another one (of the four) had been cut away to the point that it had to be removed ... 'to protect the public safety.'

"(Lawless's lawyer) said Mr. Lawless had tracked him down in a restaurant to inform him the sculpture was being dismantled. He rushed to the scene to find out what was happening and then began looking for a judge, but by then the courts were closed for the day."

**Nov. 18:** "In response to Mr. Lawless' suit to halt demolition of his sculpture, the city last week filed a $1 million breach-of-contract suit against him and a separate suit seeking permission to tear down his sculpture as a 'lewd, obscene or disgusting' structure not fit for public display."

**Nov. 22:** "Authorities say they were hoodwinked... Larry Wood, however, says he wasn't surprised.

"Mr. Wood is what is called a tube bender in the esoteric world of neon art, and he said he turned down a chance to do Mr. Lawless' neon work a year ago.

" 'There was no doubt Billie knew what it was... I accused him of trying to pull something off. I never thought he would get this far with it.'

"Dennis Wilcox also ... turned Mr. Lawless down. 'He said they were dancing dog-bones, but I've never seen a dog biscuit that looked like that.'

"Lawless was forced to have the neon tubes made in Albany. 'There was not a sign company in Buffalo that would touch it,' (another bender) said.

"Mr. Wood said he agreed to do the work, drew up a contract, figured cost estimates and made a large diagram of where the neon would go based on Mr. Lawless' model.

" 'One of the guys from another shop came in one day and said, "Gee, you know what that looks like to me?" And I said "Gee whiz" ' (Wood recalled).

"Mr. Wood said that when he told the artist what he thought, the artist 'got a little funny. He told me it was dancing dogbones. He came in with a dogbone and showed me, making like he was a little put out by my suggestion.

" 'There was no doubt in my mind what it was, and I don't think there was a doubt in his mind either,' (Wood said). I'm interested in seeing this thing come down. It's not good for my business. My friends keep asking me if I did it.'

**(see Lawless, page 10)**

# Davidson restores neon's golden age

***Editors' note: Len is the guy who advertises his neon postcards every issue, but he is also a sociologist by training and a neon sign restorer and designer by passion. Here's some background on his citywide Philadelphia neon "museum," and some advice he gave Ted about restoring old tubes:***

"In 1985 he founded what he calls the Neon Museum of Philadelphia: `I wanted to showcase the city's neon treasures, to encourage interest in the craft. And I also needed to unclutter the house,' he adds, noting that his vintage sign collection numbers in the neighborhood of fifty pieces...

"He lends neon signs from his extensive collection to downtown merchants who provide exhibition space fulfilling his criteria for a suitable home. The business or restaurant must have a stable history, maintain the sign, insure it against damage, and perhaps most important, give it a prominent location near a big picture window...

" `Restoring neon is an adventure,' says Davidson, `and the best part is that wherever there's an old sign, invariably there's some weird old guy with a story to tell hanging out next door.'

"...Davidson bemoans the homogenization of roadside America, recalling with profound regret a cross-country car trip that revealed the heartland to be `wall-to-wall shopping malls. And so much neon suffers from that mentality — it's boring lettering with some architectural borders.

" `An old-timer once told me that designers used to "put a lot of gingerbread" on a sign to sell it. If the restaurant down the street had a fancy neon lobster out front, you had to have something better.

" `So at the Twist Bar, there was a twister that twisted; at the Sun Ray Pharmacy, a mortar and pestle that stirred.' " (from Americana magazine)

" `Benders don't really want to be bothered with real elaborate, difficult designs,' Davidson says. `It's simple supply and demand. They can make so much money just running straight architectural borders.'

"The neon museum is one way Davidson hopes to improve that situation. `If people see that there are nice things that you can do with neon then they might become less satisfied with a simple sign with lettering on it.' " (from Lighting Dimensions, 11/89)

**NN:** Have you had any problem with color matching, with old phosphors that are no longer around or new tubes that simply don't look like them?

**Len Davidson:** Are you matching tubes where some of the existing tubes still light up? Usually I've been able to come up with colors that will match fairly close. You may have a situation where you just can't find a match. Sometimes I have to start from scratch, where I don't have any of the old glass, so that's less of a problem...

It's also an issue of how much of a purist you want to be about the thing... My own preference is to use as much of the original glass as possible, but it's more a sense of aesthetics.

One way is to can all the old glass, then start from scratch with the green that's similar, then you know everything will match perfectly. But my own aesthetic preference is to stay with the old glass and then just find something that will match it.

They used to use whites that are more pinkish than any that are made now that I know of. But, again, if you look at both the different manufacturers' 3500 white, and then there's also two pink-whitish colors; are you familiar with them? I don't know if Voltarc has one they call pink-white, but FMS has one that's called pink-white, and EGL has something that's called H37 pink, I think, which is also a pink-white...

But you don't have as many to choose from as you do with the greens, so I don't know how close you could come.

**NN:** When you have pieces where the powder has been blown from breakage, do you try and, what, shake the powder out and repump them, try and keep it original?

**LD:** Well, yeah, I do usually try to keep it original, because if you have the old sign it would probably have breaks in it and repairs from over the years; it's never going to look like brand-new anyway.

If you've got places where it's broken and repaired and it's just got this powder then fine, you could just live with it that way. Or if it's got breaks and you were gonna remake the tube and you end up with powder missing in the tube, to me that's okay too, it

**(see Restore, page 11)**

THEATER

# Theaters grew brighter with the movies

"As moviegoing became an established practice across the country, patrons witnessed the birth of a distinctly American architectural creation: the motion picture palace. The decor of many of these theaters mirrored that of Old World palaces of the past...

These theaters were built essentially to serve a purpose that was purely economic: attracting moviegoers to the box office. Their exteriors helped fill this role, using forms and styles that made them stand out from their surroundings.

A broad canopy marquee, often accompanied by a towering vertical sign, announced the building's name and purpose. To make sure than nobody missed the message or the latest film, tracer and chaser lights were used to trim these often elaborate signs.

Early Nickelodeon theaters pioneered the use of outdoor electrical signage. Many of the early theaters outlined their arched and gabled facades with light bulbs...

Designers of the new movie theaters built on the tradition, seeking to catch the eye of potential patrons by outlining exteriors in stud lights and topping them with illuminated billboards as well as painting marquees in light."

*—from "Great American Movie Theaters," by David Naylor, Preservation Press, Washington, D.C. 1987.*

RESTORATION

# Road show: A tale of five theaters

## I. A small-town romance

For years we've had a fantasy about restoring small-town movie theater marquees in the Midwest.

We imagine a mobile shop setup for Ted, lots of historical digging and interview legwork for a book project for me, plenty of friendly people and sweet corn and prairie sunsets. Eventually these efforts would climax in gala re-dedications of these theaters, which for decades were the neon hearts of their towns.

This summer we had mixed emotions when we saw two of the Minnesota theaters we had imagined restoring. They were relit and bright again. But they were done badly, stripped down to hideous paint-and-light combinations, many of the old tubes yanked out forever.

Now, we're not purists. Small-town theaters are struggling to survive; one of them was doing more business renting videos than selling movie tickets. So maybe an inexpensive-but-bright solution was better than nothing.

But we do wonder how much information folks had when they planned the re-do.

Did they know what the theater had originally looked like, or just what it looked like after decades of broken tubes and patched-on incandescent lights? Did they know about the other theaters in the chain, and who the designer was? Did they ask older folks in the town what they remembered, and whether the theater had an organist or traveling performers?

It looked as if they hadn't bothered. But maybe whoever paid for the new tubes and paint didn't know where to look to find out. Or it was too much trouble for somebody to track down the original design to remake the missing tubes.

I think they missed a chance to bring the towns together around their theaters again, to make people proud, and maybe to involve the local historical society (and its community ties and funding sources) in the job.

And, finally, whoever made the replacement neon missed out on remaking a lot of neon footage that was in the original sign.

## II. Big-city detective work

When Ted restored a theater marquee from the 1940s last summer in Minneapolis, we were surprised by how difficult it was to find information on the theater's original appearance.

The group which had wrangled the restoration grants had no idea what their building had looked like. Nor did they know about the later addition that drastically changed the building's layout and function: a building built with a sizeable performance stage was redone for cinema use, and a lobby area was added (or rebuilt) much later.

I dug this information out of county historical society records, my newspaper's architecture reporter, the city building permits office, and several historical librarians. One librarian tended the archives of one of the nation's major theater designers, Liebenberg and Kaplan; these are filled with proposals, sketches, and plans.

There was a bid in these archives for the very theater we were looking for — but it had been rejected, and the work was done by another firm. No sketches or photos of this design remained; all we found was a newspaper clip announcing the theater's original opening and a street map showing the space the original theater occupied.

Well, so much for what we didn't find; here's what we did for the restoration:

Money was limited, so that killed our suggestion to light the theater's curved marquee (that's the specialized term for the lower part of the signage, not the vertical or upper elements) with a border tube.

Instead, Ted repaired the neon name of the theater, and cleaned and repainted the letter cans, and repaired and painted the metal framework holding a fluorescent-lit plastic signboard below the neon.

We also threw in a suggestion that they cover the fluorescent tubes with green theatrical gels to set the signboard off from the pink neon and turquoise painted metal; they went for it.

Ted raced to finish it the week baby Lionel arrived, and it looks fresh and colorful once again.

**(see Marquee, page 6)**

# Resources for re-dos: Where to dig for theater history

In case any of you have a soft spot in your heart for an old theater, or you want to play the long-shot game of getting public and foundation monies to restore one, here are some resources on theater preservation:

David Naylor's "Great American Movie Theaters" (Preservation Press, Washington, D.C. 1987) is a good starting place. Naylor has also written on theaters for Historic Preservation magazine, and did an earlier book, "American Picture Palaces." His recent book is an extensively illustrated, state-by-state guide in which he refers to these good sources:

— Alastair Duncan's 1986 "American Art Deco";

—— Ben M. Hall's 1961 "The Best Remaining Seats";

—A. Craig Morrison and Lucy Pope Wheeler's 1978 "Nickelodeon to Movie Palace: Ten Twentieth-Century Theaters 1910-1931" (Historic American Buildings Survey, U.S. Interior Dept.);

— Ave Pildas and Lucinda Smith's 1980 "Movie Palaces";

— R.W. Sexton and B.F. Betts' "American Theatres of Today" (reprinted in 1977 by Vestal Press from 1927 and 1930 originals);

—Dennis Sharp's 1969 "The Picture Palace and Other Buildings for the Movies";

— Richard Stoddard's 1978 bibliography, "Theater and Cinema Architecture: A Guide to Information Sources" (Gale Research);

— Robert Stoddard's 1978 "Preservation of Concert Halls, Opera Houses and Movie Palaces" (Preservation Press);

— The Theatre Historical Society's 1980 "A Pictorial Survey of Marquees" (this group also publishes a quarterly, Marquee).

—American Institute of Architects; 1735 New York Ave. N.W.,

**(see Resources, page 12)**

## (Marquee, from page 5)

### III. High culture in Honolulu

In Honolulu, we've seen the other extreme: a huge, majestic, landmark theater that is being "restored" to an ideal no one can remember — without its familiar neon marquee.

The Hawaii Theatre was built in 1922 and a fabulous marquee was added in the 1940. Despite the fact that all living residents of the city remember the decades of bright neon, the restoration honchos want the original music-hall look restored. They want to tear down the intricate border wrapped around the building and the huge vertical sign long visible from two streets in the old downtown.

We made some inquiries about helping with the restoration two years ago, and were treated to a private tour of the whole theater led by an old gentleman who had run the projectors there in the 1940s. The place is awesome: we saw the old ice-water air-conditioning system, the redwood balcony, the walls of heavy electrical switches and dimmers for the stage productions.

We were of course interested in helping restore the theater, but they said funding wasn't yet available, and then we moved to the Big Island.

Then we heard that neon wasn't in their plan. Ted got mad and wrote this letter to the newspapers:

*"There is something about the restoration of the Hawaii Theatre, downtown Honolulu, that not many people are aware of — the neon marquee will be torn down and not replaced, according to current plans.*

*"The neon is not part of the original structure and therefore this 'restoration' intends to remove it entirely — despite the fact that the marquee is over 50 years old, is beautiful, and is by far the grandest neon display in the state. How many people remember the theatre with anything but the elaborate marquee?*

*"This decision is apparently being made by one person, Mary Bishop, a mainland consultant for the non-profit Hawaii Theatre Center. Too bad such a decision isn't open to a public forum — I doubt that such a thing would even be considered at all.*

*"I think that losing the marquee would be terrible, and I think that since the public is being asked to pay for the restoration (now to the tune of $10.4 million) we should know what we're losing."*

Last we heard, the project's chief dismissed the letter as a signmaker's self-interest. But we were no longer in a position to relight that marquee. It just seemed like such a shame that the "restoration" would darken precisely what everyone remembers about a downtown landmark.

### IV. High water in Hilo

One of Hilo's claims to fame is its devastating and deadly tidal waves. Each time one hits, it takes out another block of bayside buildings downtown.

So it might surprise some people that the city's biggest historical restoration project is the Palace, an old wooden theater that the 1960 waves hit chest-high. But it is, and we hope to restore the vertical sign and marquee within a few months.

Thus far, the project has been tied up in red tape for nearly a year. And there's no money, at least not right away, to restore the elaborate underside of the marquee over the sidewalk. Even if there was, there are questions about how to protect it from vandals: plexiglas wasn't part of the original design. So, we're facing some of the common questions and problems of marquee and facade restoration.

Now we're asking your help and war stories — and advising you to take a look around your cities for precious old theaters. Who owns them? If movies aren't keeping them profitable, could local arts groups use the space? A college? The local parks and recreation department? A convention center? Especially if the theater is in danger of being torn down, a letter to the editor or a few inquiries might make a difference. Theater restoration is a fight worth winning because it makes cities proud of their oldest, brightest neon.

*<-- Val Crawford>*

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## (Job from hell, from page 1)

drove away to a pay phone. Person who answered said she'd wait by the front door for me. Drove back, still nobody. Which door? Series of shouted pleas to janitors and long waits before I was allowed inside.

Went inside with ladders, and got up into the ceiling. No access to the sign — it's up higher still. Finally manager came and took me back to where the real access is.

I brought 100' of power cord and a clamp-on lamp, but the cord was too short. After the manager finally found another cord, I got back up there and saw that the transformers weren't there.

Headed out to the parking lot, and the truck was there. Middle-aged guy at the wheel, George, pulled the truck around; I watched him put a wheel up over the curb. Manager said, "He's not very good, is he?" and I joked, "Don't get me thinking like that — I gotta go up in that bucket."

So I hop in and go up high, and I've never been in one of these. I go as high as it will go; not high enough. So George, swearing and mad, brings me back down and starts putting on the boom extension.

"Great," I'm thinking, "a pissed-off crane operator now too." In the hospital they said it's the anesthesiologist that you don't want to have mad at you. On this site, this guy has my life.

On the way back up, I see that the bucket I ride in is really free to swivel all it wants, it just doesn't because it needs greasing. So that when he's lifting me up and down it will tilt and tilt and tilt and then suddenly it corrects itself, dropping back to vertical, with me in a panic each time.

The first time up, he steered me right into the projecting roof, denting it. And sometimes when I point left he goes right, making me <u>really</u> freak 'cause I'm all set to counter-balance one way and then it's rug-swept-from-under-me time. Later he tells me, "I'm not the regular guy who operates this thing."

So finally I'm eye-to-eye with this sign. Okay. Now the work begins. I know the transformers are inside. I go peeking around the back edge, and see there's neon in back. Shit. Back lighting as well.

And the cans are like none I've ever worked on; there's no way to take the face off. It's not flat plex faces but curved, molded ones. What was suddenly obvious was that the whole damn letter had to come down to do any servicing at all.

And the rain has begun and I'm soaked, way up high in a bucket in a mall and we've already got $300 riding on this crane, and suddenly I want out of there so bad I can taste it.

The sign is twenty years old and very well-built, from a long-lasting trouble-free standpoint. It's just not meant to be serviced in place. And the bolts that hold it in place are rusty and hard to reach. Sharp edges next to them, and the neon's just an inch or two away.

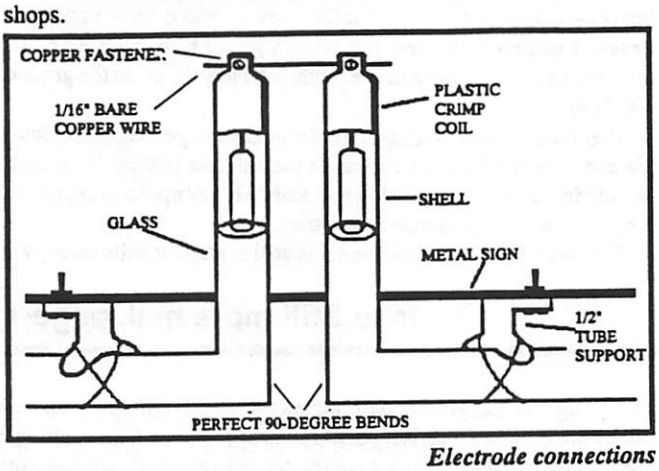
Well, okay. Let's make sure that these are the letters to work on. I call down to the crane operator and he calls to someone who calls to the manager, who finally comes out and I tell him to turn the sign on and he disappears and then I wait, up in the air in the pouring rain. Ten minutes later the sign comes on. So I yell through the chain of command again; ten more minutes and the sign is off. And like a mantra in my head is this clock ticking, one made of dollar bills,

**(see More hell, page 8)**

# Euro-neon: Hand-coating, square bends, fat tubes

By Michael Blazek

When traveling through Europe, anyone familiar with neon signs and how they are produced will quickly notice many different techniques in vogue. Metal channel-type letters with exposed skeleton neon are very popular for advertising over businesses and shops.




*Electrode connections*

This in itself is not drastically different from signs in the United States and Australia. But because 8,000-volt transformers are the maximum allowable in many countries there, larger-diameter tubing is used, often 20 to 25 millimeter. This is true for letters as small as 250 centimeters.

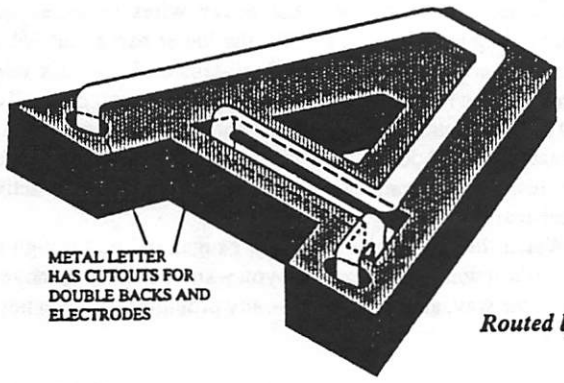
When used in letters of this size, it is necessary to make very severe angle bends on a flat plane. Out of this requirement developed the "square-bending" technique evident in Germany, Holland and some parts of Scandinavia.

Clear soda glass is used because it has better integrity when manipulated in a flame, forming the square corners by sagging into place when heated with a single-jet oxygen torch.

Because the glass is manipulated quite drastically for each bend, it is not feasible to use already phosphor-coated tubes.

Instead, the clear tubes are bent into their desired shape, cleaned with distilled water and dried thoroughly. Then a binder is applied to the inside of the tube by using tiny glass beads that have been rolled in the binder. After the binder is in place, dry phosphor powders are knocked around the tube with a wooden stick until all surfaces are covered.

This seems like a painstaking process, but when applied diligently, it leaves a uniform coating that is unbroken by normal welding breaks in the powder. This method will also eliminate mercury staining due to phosphors breaking down while they are being heated in a bend, which can occur in certain colours of the pre-coated tubes, notably blue and whites. *<Note: see Letters section.>*




*Routed letter*

When used in conjunction with the metal letters, each metal letter has its own neon tube. This keeps tube length to a minimum, with the result of less fragility and better pumping quality. In the States, this area is ridiculously overlooked.

The metal letters also have a routed space cut out for the sections that double-back. When used in conjunction with short tube supports, this allows the neon tube to be mounted very close to the metal face. This has a better look and leads to uniformity in letter style; each letter is made in the same way and fitted into a standard cut-out letter.

When electrodes return to the same proximity, as in a round letter or in successive border tubes, I noticed that they penetrated the metal surface almost next to each other, instead of being spaced apart to avoid arcing.

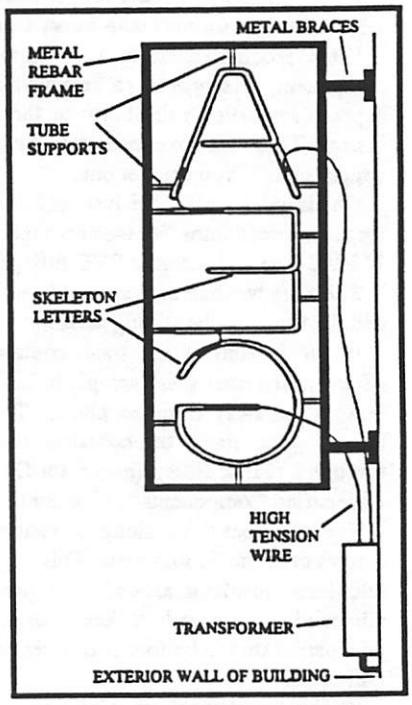
When I asked how this was possible without leading to electrical shorts, I was shown a unique process by a German glass bender working in Haarlem, in the Netherlands.

Herr A. Joppe of Vasro Neon Lichtreklame painted a dilute solution of acid over the electrodes after the tube was sealed off with the correct pressure of inert gas. This acid etched the glass surface and supposedly made it impervious to shorting when in close proximity to other electrodes.

The brand name of the product he used was Flussare 71-75 percent (a tiny bit, mixed with tap water) and came from Riedel - de Haen Ag, D-3016, Seelze 1, which is in either Holland or Germany.

In Italy, many neon signs are mounted vertically from metal frames attached to the building fronts. The neon letters have all their electrodes doubled-back and one unit is attached to the next by bare wire, sometimes very flimsy wire, luckily out of reach.

Some signs are double-sided so they read correctly from both directions. But others are only single-sided, appearing correct from one angle and back-to-front from behind. This offers no confusion to the dyslexic or to glassbenders, who constantly view their work back-to-front when making it.




*Exterior signage*

At one cafe in Milan, I saw a meticulous example of a hollow brass letter with a neon halo spelling out "Campari." I sat at a table to make a sketch of it and when a waiter came, to be polite, I ordered a soda.

They must have been trying to recoup the fortune they spent on the neon sign; my small drink came to over US$7. I was so involved in drawing the sign that I forgot that sitting at a cafe in Italy raises the price of drinks by three times.

*Michael Blazek is a co-owner of Neon Specialists in Brisbane, Australia, and is co-author with his dad, Dean, of an upcoming book on neon. This article first appeared in an Australian magazine, Sign News and Screen Printing.*

## (More hell, from page 6)

about 75 an hour.

Try again on the bolts — these letters have got to come down, that's all there is to it — and feel this urge to cry. No. Don't cry — just get the job done and get out of here.

I see I need to heat the bolts if they're to budge, and of course I didn't bring a torch. I run to a hardware store and buy a small propane torch. No, they don't have matches. Run to the restaurant next door and finally a waitress gives me some matches. Looks at me a little funny too. Yes, I'm soaked and filthy already.

The torch was hard to light and so I lit it before heading up. Up to the first support bolt — okay, heat it. Now where do I set the lit torch down? There's no room in the bucket, and besides, the bucket is constantly swiveling.

So the whole while I'm up there I'm in this panic dance with the bucket, trying to reach but not reach too far. Set the torch down, carefully, on the semi-flat surface of the other letter, and tell myself, "Don't forget the torch. Don't bump it."

They installed the sign with square nuts, meaning that there's very few angles that I can get a wrench on it from. Hands slip and cut into sharp edges of can's back edge. Slip again, smack into the glass. But no break — yet.

The rain comes again, strong. One bolt is finally loose. I heft the letter — these are three-foot-tall letters — and it feels impossibly heavy. I can move it, yes, but what's going to happen here? I'm going to hang on to these suckers while he lowers me to the ground? NO WAY.

That taste is back — outa here. I signal George to take me down. He can't see me 'cause he's out of the cab and talking to someone twenty feet away. Well pardon me, hate to break up the nice chat, but I holler and finally he takes me down.

The torch is off now but the tip is still hot and it rolls on my arm

(see Still more hell, page 11)

## (Choke, from page 2)

position.

**Materials and construction:** I made my unit with a Rubbermaid "Roughneck Jr." 8-gallon trash container (nothing but the best). For leakage safety everything is then set down inside a 30-gallon plastic trash barrel. The wire is 6-gauge stranded copper (large enough for a 10 KVA transformer) with heavy insulation.

Peter recommended a 1/4" copper plate for the bottom component; this proved to be unavailable on this island, and I happened to have a pair of bronze, threaded rods and so used them instead. These tend to concentrate the heat and I'd recommend the copper plate if you can get one.

On his unit Peter said he just used a copper plumbing component for the top conductor. For the upper (sliding) section I used 1/2" and 1" PVC pipe and assorted PVC fittings.

There are two halves to assemble, the bottom with the fixed plate and the top with the sliding section.

In the bottom of the trash container I placed a number of siliconed-together glass scraps, to keep the exposed metal of the bottom rod away from the plastic. The wire that connects to the bottom plate enters the container through a hole near the top, through a plastic fitting (meant for GTO wire, and very tight — a Diversified Components "quick connect bushing").

The wire goes down along the inside of the container to where it screws onto the bottom plate. This length of insulated wire has an additional insulator around it, a piece of 12mm glass tubing, siliconed at both ends to keep the saltwater out. The hardware connection on the bottom is covered with silicone too, to prevent corrosion.

The trick with the top part is to somehow have the conductor slide up and down, with a heavy wire leading to it (which also slides up and down), and have your hand be nowhere near the wire or the top of the container.

Start with the lid of the trash container, and drill a hole in the center large enough for the 1" PVC to pass through. This 1" PVC pipe acts as a sleeve that the 1/2" PVC pipe slides inside of.

To secure it to the lid I took a 1" PVC slip-on straight connector and cut 5/8" off the end. This 5/8" ring then goes on top of the lid, and the rest of the cut piece goes underneath, all cemented into place. Thus the 1" pipe passes through the lid and is held securely in place.

This 1" pipe has a long groove cut in the side of it on top, to allow the wire to pass through it when the inner piece slides up and down. (The length of the groove determines the amount of up-down travel. Make the groove by drilling 1/2" holes at either end, and cutting out the section in between with a rotary dremel-type tool, or by any other clever means.)

On the underside of this a nice touch (but not necessary) is to add a rubber washer, which both closes the air gap between the inner and outer PVC pipes (no evaporation, remember) and adds enough stiffness to the sliding motion that it will hold the setting at a given position (no spring clamp needed).

To make this, buy a small piece of sheet rubber and cut it out with an X-acto knife. Hold it permanently in place by fitting it into the bottom side of the (previously cut) PVC straight connector, and cement in a small slice of 1" PVC tubing to hold it there.

The sliding (inner) section of this is made with 1/2" PVC pipe. The wire passes through a hole in the side of the PVC, down through it and into the barrel, where it connects to the plumbing piece (or whatever conductor you use).

Use silicone to shut the connection of the wire to the conductor, and where the wire enters the 1/2" PVC pipe. A 1/2" PVC end piece of some sort, cemented to the bottom of the 1/2" PVC pipe, makes a good "stop."

At the top end of the 1/2" PVC, which projects above and beyond the 1" PVC sleeve, I cemented on a threaded PVC connector — this enables me to slide the whole choke under the bench, and then have a mating "handle" piece screw into it once it's in place. This way I have a hole in the bench top and a piece of PVC pipe passing vertically through it, and my hand, controlling the choke, is miles away from any wires or saltwater.

As a final touch, a strip of weatherstripping helps to seal the lid onto the can.

One assembled, connect the heavy wires in series with your bombarding transformer, and fill the lower part about 3/4 full with water. Attach your bombarder high-tension leads to a fairly short piece of neon (an already-pumped spare tube) and gradually add the salt (a five-pound bag is more than enough) to the water in a series of repeated steps: Add salt, stir it in, close the lid. Set the choke slide to the lowest position, dry your hands, step back, activate the bombarder.

Watch the bombarder milliamp gauge, and go through the steps until it's at whatever maximum you want to set. Now, move it safely out of the way, and remember — any problems, and you never heard of us.

# Wish books and must-haves: more obscure suppliers

**Varian Associates Inc.**
**Vacuum Products Division**
121 Hartwell Ave.
Lexington, MA, 02173
(617) 861-7200
FAX: (617) 860-5437

Varian sells vacuum pumps, gauges and vacuum-system hardware, most of it very pricey and very nice. But something that every manifold builder and repairer can get wide-eyed about is their **Torr Seal low-vapor-pressure resin sealant.** This, in particular, is what Peter David recommended Varian for, and I just bought some myself and second his advice.

The price is $39 (with a minimum order of $50) and actually winging your way through their phone maze and placing an order can be difficult. I left a message, and was supposed to get a call back, and a week later called again and insisted on talking to a real person.

But the stuff is good. It's a two-tube mix-together epoxy resin which makes a stiff white paste which cures out to a rock-hard finish. They claim that it can be used to pressures of $10^{-9}$ and below, and temperatures up to 120°C.

So the next time your manifold leaks (undoubtedly in the middle of a large, important rush job) just mix some of this up, dab it on, wait a few hours for it to cure out and Leak No More. (My own use for it was to coat all threads on a manifold made of stainless-steel pipes, and it stopped some tiny leaks that I couldn't find before.) Call for a catalog.

**Metra Inc.**
**High Vacuum Equipment**
2605 Cabover Dr. #7
Hanover, MD 21076
(301) 761-4141

Metra has:

— Gauges, including a thermocouple-type vacuum gauge listing for $335 complete; deduct 25% from that for your actual cost. This is for the entire set up of controller, gauge tube and cable, making it the cheapest micron gauge that I know of. Replacement sensor tubes are $48 list (compare that with the $90-$100 elsewhere). (Remember, when setting up a thermocouple or pirani gauge you need a grounded, stainless mesh screen to stop the bombarder flashback from hurting the sensor tube. The easiest way to do this is have a pair of KF-type clamp fittings and a centering ring with screen. The sensor threads into one KF, and the other KF can have a Cajon-type fitting to connect it to a glass manifold.)

— Welch and Leibold vacuum pumps

— KF-type fittings for manifold construction.

— High-vacuum leak sealant, either brush-on or spray-on, with an extremely high temperature tolerance, as well as high-vacuum epoxy resin, which looks like it might be similar to the "Torr Seal" described above (but in smaller tubes, and likely at a cheaper price).

— A great assortment of traps and filters for mechanical vacuum pumps, including a $39 (list) disposable mercury adsorption trap, which stops mercury from entering your mechanical vacuum pump and/or keeps pumped vapors from entering the room.

Metra president George Balkoski wrote to say that there are some other items out there useful for dealing with mercury:

"There is a mercury vapor detector available from Williams Detectors. These are color-indicating cards that detect the presence of mercury vapor. The card has a chemically treated element that changes to gray when mercury vapor is present. They are individually sealed for one-time use. Sampling time is 10-14 days. A package of 10 costs approximately $18.00.

"The 3M company also makes a mercury vapor monitor that clips to a worker's lapel. The monitor is then returned to 3M for a confidential written analysis. These are very expensive.

"The 3M company also makes a low-cost, lightweight mask for protection against mercury vapor."

(Our Precision Neon Laboratories catalog (803-794-5974) lists the Williams detectors at $6 for each card. They also carry a spill paper for mercury droplets for $5.)

Thanks to Peter David for recommending these two sources!

A handy product, but hard to find, is **bronze wool.** This, as you can imagine, is just like steel wool but made of bronze. Therefore it doesn't corrode. It looks to be the very same material used in electrode savers, those thank-god-they-exist useful little items.

(Electrode savers are commercially available devices, about $1.50 each, that slip over the electrodes of still-working tubes whose wires have corroded off, thereby saving a trip to the neon shop to repump the tube.)

Bronze wool can be used to make an electrical connection, where, say, a neon tube slides into an acrylic tube, as in a freestanding sculpture. The bronze wool has a lot of springiness and therefore it keeps a good contact with the tube-end wires or button.

I found some locally at a marine-oriented hardware store ($6.39 for 3 pads) which listed the "exclusive U.S. manufacturer" as
**ISW Corp.**
P.O. Box 1767
Springfield, Ohio, 45501.
(Contact them to find a nearby distributor.)

**Books Nippan**
(office) 115 W. 57th St.
New York, NY 10019
(store) 532 W. Sixth St.
Los Angeles, CA 90014

Gorgeous, trendy, expensive and mostly Japanese-produced books on international signage, typography, logos and trademarks, corporate design, and all things bright and colorful.

"Facade and Advertising Signs of Excellent Shops" (three volumes) is intended as a resource for prospective sign customers; "Facade and Sign Designs" does the same in two volumes. Another book called "Light Art Gallery" was edited by a major Japanese electronics corporation, which sponsored a contest for lighting designers.

We are pleading with them for review copies; if your business can't handle the tab to own a few, you can look for them in libraries, particularly business-school collections. In Honolulu, I've found them in bookstores; you can try in California or New York too.

Write to them for a splendid catalog.

**Dover Publications Inc.**
31 East 2nd St.
Mineola, N.Y. 11501

As Alice fell into Wonderland when she dozed in a meadow, Val fell into Designland when she curled up with the Dover catalog.

These aren't sparkling coffee-table books, but they add up to a bargain-priced design library spanning thousands of years and dozens of cultures.

This reprint publisher sells books on lettering styles, symbols and period graphics for a pittance: from $3 to $8 each, mostly. Nothing too up-to-the-minute, but great on things as relevant to neon design as art deco, art nouveau, and advertising art for the last two hundred

**(see Suppliers, page 12)**

## (Lawless, from page 3)

"(Lawless said) 'The reason I went to Albany was that's where I got the best price. It cost one-third of what it would have cost in Buffalo.' He added that after the tubing was made initially, sections of it were repaired in Syracuse and Rochester because he broke them...

"Mr. Lawless said at one point Mr. Wood said he would like to take on the tube bending job 'if I made some changes.' When Mr. Lawless said he would be willing to consider them, Mr. Wood prepared new drawings...

" 'I turned them down, because I wanted to remain true to the graffiti image on Bailey Avenue,' he said.

On Dec. 5, Lawless wrote: "Several years ago while driving down Bailey Ave. on a search for neon signs and sign-related imagery for a sculptural project, I was struck by a powerful image which I felt, at that time, was also very playful... As the years went by I was struck by its sticking power... while its original intent might have been obvious to some, I am sure interpretations ran the gamut of meanings.

"...Ironically, the sculpture has fallen victim to its own poetry. We had been hopeful, wishful that there would be a dialogue within the community over what we intended to be seen as a very complex sculpture. Of course, this intense reaction toward one image, only one part of the entire work cannot be ignored because it tells us something about ourselves...

"(One viewer) angrily remarked, 'One more example of male dominance.' Yes! Exactly! Male dominance; but burlesquing male dominance and the myths attendant to male sexuality: power and dominance. It's that simple, or is it?..."

A Dec. 16 art review: " 'These neon figures, which were timed to move through eight phases over 45 seconds, are about 8 feet tall, drawn in a single line of orangy-red tubing to depict an odd dancing figure carrying a cane and wearing a top hat ... the body of the figure resembles male genitals, though comically appointed.

"After a border around the neon flashed on, the first three panels, one by one, showed the figure in a high-stepping pose, and in the last, revealingly doffing its hat for a three-position bow — a bow that was variously interpreted...

July 31, 1985, as the sculpture was packed for shipment to Chicago, Lawless said, "Maybe what this work needed was a more sophisticated audience."

April 12, 1990: The legal battle between Buffalo and Lawless cost the city over $40,000 in legal fees, the newspaper announced. "Green Lightning" was still in Chicago, "where it has been on display since without apparent controversy."

**An interview with Lawless two years ago on National Public Radio's "All Things Considered" dealt with a later artwork and a similar legal battle:**

Narrator: "...Billie Lawless does not scare easy when people get litigious with him. It's a useful virtue when you're in court up against the city of Columbus, Ohio, and your art is on trial.

"The work of art in question is called 'Didy Wah Didy'...The city of Columbus says it's a graphic, more billboard than sculpture and that 'Didy Wa Didy' is too close to the highway and has to come down. Billie Lawless suspects they mean it's too close to the truth, and he says it has to stay up."

BL: " 'Didy Wa Didy' stands about 26 feet tall and it's about 18 feet wide and about 2 feet deep, and is essentially a neon and steel piece. The neon has a narrative to it that goes on for about 45 seconds.

"There's a young boy who's watching a nuclear bomb actually explode and then he gets alarmed, and then in the last part of the sequence he gets turned into a skeleton: he gets nuked. And then the four corners, on fluorescent plexiglas, are little messages that say 'Thrills, Spills, Chills' and then the last one in the lower right-hand corner says 'Death' with a skull and crossbones that flashes on and off.

"The text on it says 'Atomic Playground Ahead' which stays on all the time, and on the right side it says — this comes on during the narrative sequence — 'Kids, ride the big one.' It's right along Interstate 70, which is a main east-west thoroughfare across the country."

NPR: "Therein seems to lie a lot of your problem."

BL: "Exactly."

NPR: "Right along the interstate. The city attorney's office, in Columbus, they said they had two problems with this sculpture. First, no one had sought a permit to put it up, and as far as they're concerned it fits the description of a graphic. And second they said it's much too close to the freeway. It's within fifteen feet or so of the right-of-way of the highway, and really, off-premise graphics are supposed to be 600' away."

BL: "Well, that has been their point. Let me address the first point

**"He said they were dancing dogbones, but I've never seen a dog biscuit that looked like that," one bender said.**

that you brought up about the permit. The city requires that a sign has to have a permit, and obviously I've been making sculptures since 1972 so I think it's been proven by my attorneys that there's no doubt that this is a sculpture so it does not need a sign installation permit.

"Secondly, it's being too close to the freeway — there was another sculpture in the same exhibition done by Richard Harned, who is a professor at Ohio State University, and it was actually a neon piece that was quite larger than mine... and it was just as distracting...

"So what I'm saying is the reason they cited me was the content of my piece. Mr. Harned's piece was an abstract, called "The Winkamatic" and it didn't have any disturbing content to it..."

NPR: "I should point out that the city of Columbus says that their code defines not signs but graphics, and that a graphic would include signs but other things. But let me ask you this question: from your description of 'Didy Wa Didy,' in order for this piece of sculpture to work, doesn't it have to strike the passerby, at first, as a sign?"

BL: "Well, that's not my intent. I think of it purely as being a sculpture. I think people are intimidated and threatened by sculpture — it's three-dimensional, it's real, it takes up time, and so when people encounter these things they're frightened by them and then they have the reaction is, get them away and remove them...

"Actually we had this humorous incident at one point — the lawyer representing Heritage Village said, 'You know, Billie, your sculpture is really distracting. I'm driving down the freeway and I'm trying to do my dictation and talk on my car phone and I just can't do all those things at once.' That in itself, I think, said it all."

Back to the Buffalo News for a postmortem on this one: on March 28, 1989, the "Didy Wah Didy" sculpture lost a legal skirmish in Columbus; city officials said it lacked the necessary permits, and ordered it dismantled after the show.

# Doubts? Don't dispute diffusion difference

By Phil Baker

I have a Pyrex manifold with greaseless stopcocks. I put a Pirani (HPS 917) gauge on it about six months ago (up until then I'd been "pumping by ear"). I did this because I'd had some problems with long age-in times, snaking and hot-burning tubes.

When I got the gauge going I found out my vacuum pump (an old but reliable Cenco Megavac) was only getting down to about 6-7 microns at best. Also, when I valved the pump out, the pressure in my system went up pretty fast — around 1.5-2 microns per minute. I could valve the pump out for 24 hours with my filling gauge stopcock closed and have 3-5 millimeters or more "leakage."

I was familiar with diffusion pumps from my engineering and lab training and started thinking about getting one. I talked to Mark Snyder at Precision Neon Laboratories and several references he gave me. After much consideration (and going deep into the pocket) I got a diffusion pump from PNL for around $700.

It was fairly easy to install (about three hours). It uses threaded compression connectors with viton rings to attach to your system; these work pretty slick.

So after the initial warmup period (about 30 minutes) the thing kicked in and the vacuum improvement was dramatic. My system pressure went from 7 microns down to about .7-0.8 microns (although the Pirani gauge is hard to read down on that end).

Along with the order of magnitude improvement in vacuum level, my pumping speed also increased considerably. After bombarding, the system pumps most tubes down to 1 micron in about 20 seconds — even before the electrodes stop glowing. In fact, you have to be careful when pumping because the pump will evacuate the tube too quickly after opening the main stopcock and your bombarding current will fall off.

The diffusion pump also reduced the system's "leakage rate." After several days of operation the rate of vacuum loss (after the main stopcock was valved out) decreased significantly.

I realized that the high vacuum level achieved with the diffusion pump was outgassing my system and that the "leakage" I'd been observing was really outgassing. Now my leakage rate is down to less than 0.05 microns per minute. I recently shut my system down and valved everything out for five days and only had 350 microns "leakage."

My problems with age-in times and hot tubes have gone away, so I suppose my tubes really are better. It was a pretty high price to pay, but I sleep a lot better at night.

So that has been my experience with a diffusion pump. It just sits there and runs and requires no maintenance. I've only had to change oil in it once when I didn't relieve vacuum on it when the system was shut down. It pulled the oil from my mechanical pump into the diffusion pump.

## (Restore, from page 4)

just looks like an old tube, you know — having sort of mottled colors.

You're really asking not so much technical questions as aesthetic questions, and it ends up boiling down to your sense of aesthetics — or your client's.

You really have to talk it through with them and telling them the options, telling them that you can try and match it but it won't be perfect, or you can use some of the old glass or none of it; just lay it out with them.

See, when I restore these things, I do it for myself, and very rarely, except in the case of the Simple Simon sign, which I sold to the Henry Ford museum. I don't have a client in mind, I'm just making these things for my own use, so then I go with what usually follows my own aesthetic sense, which is to try and keep it as original as possible.

NN: I'm curious: were you able to get the "Pat's King of Steaks" sign (featured in the postcard series)?

LD: Not yet; I'm working on it. There's a guy who's the son of pat who still owns a bunch of Pat's Steaks franchises, and he's real interested in getting this thing back and owning it. And I don't really care if I own it or not, so I offered to work with him. And hopefully he's going to put up the money...

What he's trying to do now is to get the city to condemn the sign, and then he'll be able to get it down. And then he'll have to pay the crane company to move it, and he'll have to pay me to restore the sign, and then he's going to have to find a place to put it back up.

It's really an unmanageable sign in that it's huge; it goes beyond the size of what I can personally deal with handling, because it needs crane trucks and it needs a site in Philadelphia that would be gigantic for putting it back up, so I'm real happy to let him deal with that part of it, and I'll just do the technical part of restoring it.

## (Still more hell, from page 8)

while climbing out — nice burn.

I tell manager, "I'm afraid I can't do this job. These letters are meant to lifted with a crane — they're too heavy." He laughs and says, "No way. I've moved those letters around — they can't weigh more than 40 or 45 pounds — you could just lift them. If you want I'll get you a rope."

I hesitate, and then say okay. Maybe it's just the stiff mountings that make it feel heavy. I get back up there, disconnect the electrical box. I'm aware that I'll need to simultaneously turn the wrench on the last bolt and grab the can tight with both hands.

It's one of those pensive moments — "Will the weight of this, combined with me holding it, tilt this bucket over? Do I really want to make this final turn of the wrench?"

I did, and the whole thing came crashing away and down. I managed to hold it but the glass broke and went tinkling down.

Once on the ground, we hefted the letter. "Seventy-five pounds, I'd say," said George. Ker-rist. Now the glass is broken, now there's no turning back.

So I'm back up, working on the second one, and I notice that the "weatherproof" junction box, finally torch-heated and pried open, is full of water. The primary wires are sitting in water.

"This is the one that didn't flicker at all — maybe it's just the primary wires" and so I disconnect them, pull them out of the water, and bring up a power cord from the ground. I really don't want to pull this letter down, 'cause it's even bigger than the other one.

I plug only one wire into my cord, and the letter lights up! Yes! Can leave it up!

But then something goes "pop" from inside the can and it goes

(see Escape from hell, page 15)

## (Suppliers, from page 9)

years.

Free catalog on request; ask to go on their mailing list too.

**21st Century Neon Works**
2355 Cove Ave. #304
Los Angeles, CA 90039
(213) 662-6666

Richard Jenkins (a frequent Neon News contributor) sent us a set of his "Quick & Easy" neon pattern-making templates for review.

These are a set of three 8"x10" flexible plastic sheets, and they have virtually every kind of mark and indicator that you're ever likely to need (and probably a few you've never used before). These are to be used in addition to french curves, straight edges and flexible curves.

What I like here is the effort toward standardization, which could lead to a common pattern-language for tubebenders and especially for non-benders who design in neon. We need to be able to indicate a double back here, a crossover there and have it understood. (In my own little world of patterns and pattern-making I've come up with my own symbols and marks, which serve as an effective shorthand to myself but don't do a lot of good for someone else).

Beginners will welcome the basic explanations about electrodes and other esoteric things included in the set. That's nice — if you come into my shop and you want neon made for your project, the cost is going to be far less if you hand me a pattern all ready to go.

At $50 the set doesn't come cheap, but for people doing a lot of pattern-making it could be a fairly short-term payoff. They look like they will last a good while, and are color-coded for quick see-and-grab.

My only gripe is that they're set up for pencil use only — I find pencil marks too hard to see by the time a screen is laid on top of a pattern and the room is dark enough to see flames clearly by. I prefer marker pens — how about another, enlarged set for the "Sharpie" crowd? (Actually, a good way to use these and get a nice dark line might be to use carbon paper and a sharp-pointed tool.)

Which reminds me a trick that Larry Graham of Tempe AZ said he uses — when making channel letter patterns (sort of the opposite extreme in pattern-making here) he uses carbon paper with an open-end wrench — the twin points on the tip of the wrench make very quick double-lines.

Larry also showed me a transformer base that he's marketing, made of ceramic with core-and-coil units inside. Prices are around $50, less in quantity. The bases look well-made; their art-deco appearance will look fine with many free-standing pieces. For more information:

**West Coast Custom Designs**
8648 South Kenwood Lane
Tempe AZ 85284
(602) 820-9517 Fax: (602) 839-4541

## (Resources, from page 5)

Washington, D.C. 20006

— **League of Historic American Theatres**, c/o the National Theatre; 1321 E St. N.W., Washington, D.C. 20004

— **Library of Congress Prints and Photographs Division**; Washington, D.C. 20250

— **Design Arts Program**; National Endowment for the Arts, 1100 Pennsylvania Ave. N.W., Washington, D.C. 20506

— Three programs of the National Park Service/Interior Department: **Historic American Buildings Survey, National Register of Historic Places, and Preservation Assistance Division**; address for all is P.O. Box 37127, Washington, DC 20013

— **National Trust for Historic Preservation**; 1785 Massachusetts Ave. N.W., Washington, D.C. 20036 (also several regional offices)

— **Society of Architectural Historians**; 1232 Pine St., Philadelphia, PA 19107

— **Theatre Historical Society**, P.O. Box 767, San Francisco, CA 94101

## (Bulletin board, from page 16)

*due to the DC bias voltage in the tube. The opposite end of the tube, which now has less mercury, will become dim.*

*"If this mercury migration has happened to your sign, a quick way to fix it is to reverse the high voltage leads... The tube will now become bright over its entire length in a very short time."*

*They also list some processing tips to help prevent this: Be sure and get the electrodes hot enough; do not dump the mercury into the tube hot; be sure and use enough mercury, and roll some to both electrodes; cure-out the finished tube completely.>*

Also Phil said that he likes Richard Jenkins' idea of an expert list, but he isn't comfortable with the connotations of "expert." He suggests instead "How about `I speak X' instead, like `I speak chemical engineering and high vacuum'?" His number is (501) 222-5470, evening hours / Arkansas time zone.

Any other experienced folks willing to be available via phone?

From **Kathee Laffranchi and Charlie Sparks** of Renaissance Neon (Lancaster CA) comes an endorsement of MONA's Neon Bus tour of Los Angeles; they advise reservations because it tends to book up ahead of time.

A quick note on **Rudi Stern's** new book, Contemporary Neon: It is simultaneously wonderful and depressing. Depressing because after looking at it, it's very hard to go back to channel letters and "open" signs.

**Tech 2000's Tom Skarvada** called to say that there was one item in the last Neon News that "rattled our cages a little bit": Michael Harms' question about a supplier for miniature beadmaker transformers now that Tech 2000 no longer makes them.

"It made me personally feel guilty. I said 'Wait a minute — we want to do special things in neon, here's a specialty item, why aren't we doing it any more?' So we're coming up with a new one. It's not going to be what we had before — it's going to be something new, a variation on the `mini.' "

**EGL's Kevin Rourke** called to say that contrary to what was reported in the last Neon News, EGL will directly supply small quantities of glass, and that anyone looking for this (or for their free color-chart sample packs) should contact him directly at EGL, 730 South 13th ST, Newark NJ 07103, (201) 824-2200, FAX (201) 642-0479. "We encourage people to experiment and work with the stuff. We want to keep people enthused, especially when the new colors come out. We carry a lot of nice, exotic colors that I know people don't even know they exist, until they get the color chart." He also noted that one of their newer colors, Horizon Blue, "Is a very brilliant blue and it has no tungsten in it, so you won't have to deal with the darkening."

*Technical difficulties: Lately a number of newsletters have not been reaching their destinations, despite first-class postage and labels. We're trying to minimize these problems with a new labeling/sealing method, but if you haven't gotten, say, your winter issue and March rolls around, you can safely assume we're not just "late as usual" —give a call or write. We'll apologize and speed one to you.*

# Tips for when neon drives you around the bend

**By Ted Pirsig**

This is going to be a regular column on bending, not just bending tips but real basic stuff. What's a basic move for me may be an interesting and unusual technique for you, and vice-versa. So rather than shaking your head and saying "no no no, you got it all wrong," call, write or make diagrams of what your methods are; they will go in here too. Many people reading the Neon News are fairly new at bending, and what some of you take for granted others will find interesting.

My own background is this: I graduated from a 6-week neon school in 1986, and worked as an employee for two different sign companies over the next three years, doing bending and a few installs. Sixteen months ago I moved to the country and set up my own neon shop.

I've always been what some would consider an "anal-retentive" student of the craft, constantly writing down notes and logging information and approaching the whole business in a rather analytical fashion — so I have a big stack of notes and an odd passion for this stuff.

**Tips for frustration**

1) Do something completely different for awhile, preferably something easier. If you are making script letters, switch to block letters. If you're making block letters, switch to channel letters. If you're already making channel letters, see #4 below.

2) Take an hour-long break. Nap if you can. (Employers take note: judicious napping enhances productivity and drastically reduces breakage.) Put you mind completely elsewhere. Do not engage in mental dialogue about why the glass is so full of shit.

3) Build a wooden trash box for throw-away scraps of glass. Above this box have a clear patch of wall, preferably covered with wood or anything hard, toward which you can happily launch what bugs you.

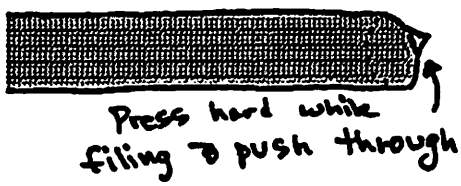
4) Quit for the day.

**Cutting glass: files and hot wires**

At my first job, the man I worked for said, "I haven't learned that much more about bending in the six years since neon school, but I sure have learned a lot about file sharpening."

A good, clean cut can make all the difference between a good weld and a raggedy, ugly little monster with a tiny hole.

I keep about five files around, because it's a pain to have only one and have to run and sharpen it all the time. I haven't noticed any particular difference between what gets sold as a "glassworker's file" and the ones available at hardware stores, other than price (guess which you pay more for). I like to have a number of small files

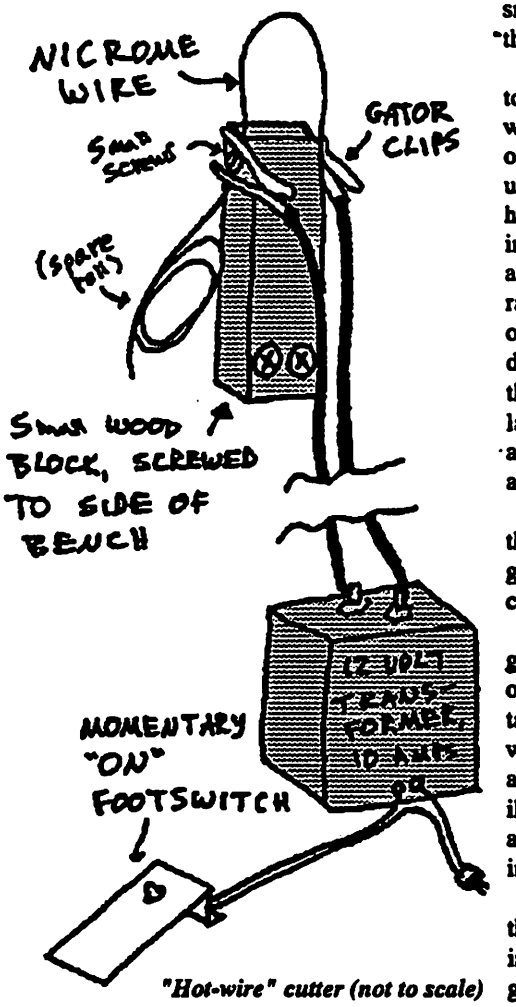



too, for getting into tight places. The best I've found for general use are 4" and 6" flat mill bastard files.

For sharpening I've used wheel-type bench grinders, belt-type bench sanders and also a hand-grinder with the file held in a vise. I've found the skinny belt-type bench sanders to be the best — there's no curve (from the grinding wheel) imparted to the file, and they're very fast.

After grinding, hold the file edgewise and look at how the light reflects — you can tell if you missed a spot, or if you didn't get a clean, ninety-degree corner.

If, after scoring and snapping the glass, you get a sharp little "pokey," place the file across where that sucker should have snapped apart, and file right through it (see illustration).




*"Hot-wire" cutter (not to scale)*

Glass that is still warm tends to snap apart unevenly. I like to work on several glass units at once, doing what I can on one until it reaches a point where it has to cool down, then setting it in a bench-mounted rack to cool and picking up another. (The rack is simply a 3"-thick piece of wood with vertical holes drilled in it, to stick the ends of the hot glass into. If hot glass lays flat in contact with anything it will cool unevenly and stress out.)

On curves, score the glass on the inside of the curve. This goes miles toward preventing cracks and shattering.

If you don't have a hot-wire glass cutter, then buy one, build one or steal one, whatever it takes. I worked for three years without one, then built one for about $40 worth of parts (see illustration). My health, sex life and finances all improved immediately.

It's not something to use all the time — it slows you down, in an addictive way — but it's great for 1) cuts very close to previously bent glass, 2) cuts on pieces that are large and awkward (and tend to fly apart under the stress of snapping), and 3) large-diameter glass, especially large-diameter short pieces (yes, you can easily remove 1/2" from that 15mm piece).

When I use my electric cutter, I still score the glass with a file first — then place the scored line right in the middle of the hot wire. In a quiet shop you can hear the slight "clink" noise of the glass cracking, and it will often just fall off. The way the cutter works is by heat-shocking the glass, causing it to stress and break.

I prefer a bench-mounted hot-wire cutter rather than a hand-held unit, because this way you have one hand on the main piece of glass and your other hand on the piece that's to come off — nothing can drop and smash.

Also, keep a small scrap of leather handy for protecting your hand when snapping off small pieces; it keeps your thumb happy in the event of shattering.

## (Single-electrode tubes, from page 1)

could I heat them and pump them? My first idea was to put a normal tubulated electrode at one end of the tube. At the other end I put a non-tubulated electrode that had a short piece of tubulation glass between it and the tube.

First I shrunk the end of the electrode by twirling the end in my crossfire until it would join onto the short length of tubulation glass. Then I put this little unit onto the end opposite to the tubulated electrode, again shrinking the larger tubing to fit the tubulated glass (figure 1). After normal bombarding and filling, I used my hand torch to seal off this secondary electrode, leaving a single-ended tube.

*Figure 1*

The problem I had though was when I had a tube like figure 2. How was I to get the whole tube clean and evenly heated?

Well, the obvious answer is to heat the entire tube up externally. This gave birth to my bombarding chamber.

Basically, this is an inverted sheet metal box lined with ceramic

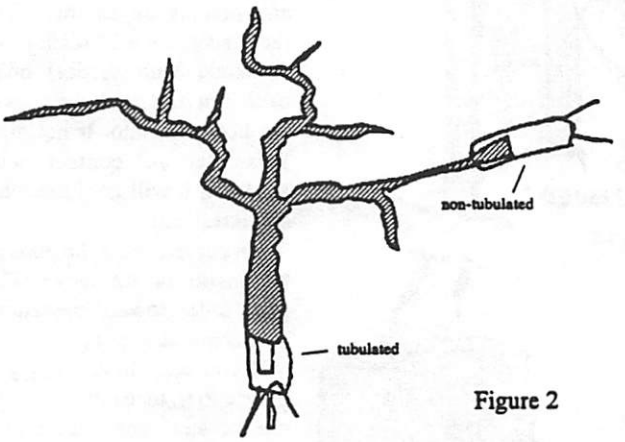



Figure 2

fiber cloth called Fiberfax, available through most pottery supply stores. It is normally used for kiln construction and is good to over 1700 degrees F, more than enough for our kind of work.

I held this cloth in with pieces of nichrome wire threaded through holes punched in the box. Copper wire would probably do fine for the 500F temperature range we work with in neon tube production.

Heating elements can be suspended inside the top of the chamber by nichrome wire too, but not in such a way as to short out the elements through the metal box.

I did this by using ceramic sandblasting nozzles as insulators, but almost any ceramic component would work, such as pottery fragments or kiln posts or 'furniture' as these parts are called in the pottery world. Remember, what's important is to suspend the elements without shorting them out.

I purchased some 220-volt nichrome kiln elements from a pottery supply store, but you could use a 220-volt cooking oven element or even a hotplate if your chamber is small.

I suggest making a chamber to suit your needs and then test elements in it using a thermometer or piece of paper to test for proper bombarding temperatures of 500F. The bottom of the chamber can be a lining of Fiberfax on your workbench.

For controlling temperature, I use a kiln pyrometer for accurate temperature readings, but any thermometer capable of 500F will do, even a cooking or woodstove thermometer.

As shown in figure 3, the tube to be pumped is placed on the Fiberfax bottom blanket and tubulated onto the vacuum manifold. Be sure any mercury traps are outside of the chamber to avoid heating and vaporizing this toxic material.

Lower the chamber, turn on the heat and pump that baby down!

Wait, though. What about the electrodes?

Well, if you purchase an induction heater (I got mine from Tech 2000 in San Diego) it's no problem. Just slip the heater coil over the electrode, turn on the heater, and presto — cherry-red in about 30 seconds.

However, if you can't afford one, you can use two electrodes on your tube, heat them both in the manner described in figure 1. Then heat the tube in the chamber and continue to pump down. When done, remove the extra electrode with your hand torch.

**A couple of tips:**

When using an induction heater, reverse the normal bombarding procedure and heat the electrodes first. This seems to help remove more impurities and reduce the dark stains so prevalent in single-ended tubes.

Also, after lowering the chamber, seal off the opening the tubulation tube to the manifold goes through with some scrap Fiberfax. This keeps the heat in.

Don't raise the chamber too soon, as the thermal shock can crack your work. Let the tube pump down until all the way cool. Then backfill to between 4 and 6 mm of gas pressure, virtually regardless of tube diameter. This is the optimum ionization pressure for high-frequency transformers necessary to ignite single-ended tubes. The exception is plasma balls and the like which require a lot of pumping (hours sometimes) and perhaps even an entire flask of gas to get the lightning-bolt results.

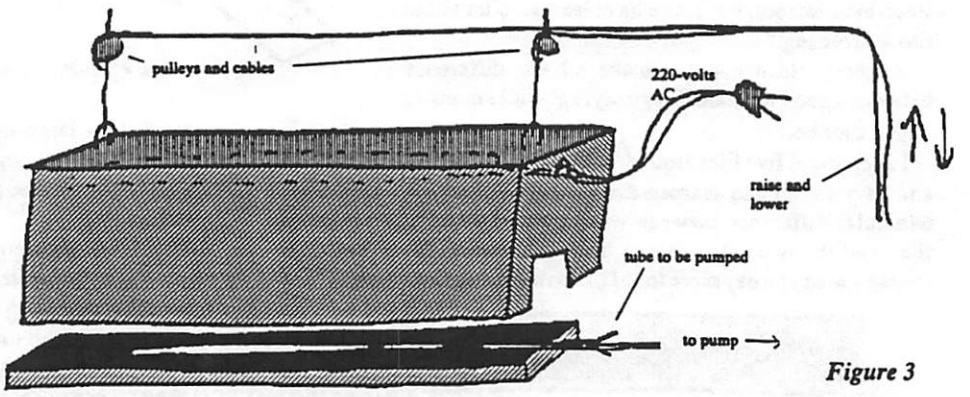



*Figure 3*

Experiment. That's the fun of it.

Sources for radio-frequency transformers I can personally recommend are Tech 2000 and Info Unlimited.

THE LIGHTER SIDE OF NEON

# Shipping neon: a shattering experience

By Audie Foote

One day about a year ago two of my employees neatly packed up about 55 eight-foot argon-filled tubes in a sturdy wooden crate about the size and shape of the coffin that guy Quequeeg built for himself in Moby Dick. While the symbolism was not entirely lost on me, its significance did not become apparent until late that night when I had The Dream.

OK, it was more like a nightmare actually. In it was my crate, loaded with thousands of dollars of neon. It was being carried over a dark and ominous terrain by six very ugly pallbearers, led by Bubba himself — he's the guy who came and got the crate for Aloha Air Cargo. (Remember, please, that "aloha" also means "goodbye.")

When they reached the edge of the cliff, they raised the coffin over their heads and hurled it into the murky jagged abyss, and howled with delight at the sounds of crunching wood, popping tubes and smashing glass. The crate came to rest about a mile down, impaled on sharp rocks, with mercury oozing out of gaping holes. Completely unrepairable.

I sat up in bed with a start, sweat running down my face, relieved to know it was all a dream.

YEAH, RIGHT.

A week later I heard from the folks on the recieving end that the crate had been speared to death by a forklift operator (Bubba perhaps?) who managed to break all but four tubes.

Was the premonition a coincidence? I think not.

You see, packing and shipping neon tubes is the most frightening aspect of the whole neon business. I'm not saying it can't be done, but I've been on the sending and recieving end of hundreds of neon shipments and I can sum up the whole experience in three easy words: Snap, Crackle and Pop.

When asked by distant customers whether it'd be best to ship their neon to me or just have me make it, I invariably reply "You can pay me now, or you can pay me later."

Most neon that I repair has been damaged in transit, and to make matters worse most shipping companies refuse to insure neon. One way I get around that is:

*Them: "What-are-you-shipping-it-looks-like-neon-we-don't-insure-neon."*

*Me: "It's not neon; it's long, skinny light bulbs."*

I could go on with advice about the best way to pack and ship neon — and I've seen dozens of methods — but instead I'll end with a question for anyone who is contemplating shipping neon anywhere:

HAVE YOU SEEN THE GREAT WHITE WHALE?

## (Escape from hell, from page 11)

dead and has gotta come down. Right in the middle of this I imagine being anywhere but here and I'm angry and scared and tired. "How did I get into this? How can I get out of this?"

I proceed to disconnect the electric, but the slide-in weatherproof connector, with its securing nut removed, won't come out. I'm hitting that manic/panic state that used to come sometimes when working on cars, where wrenches start flying, knuckles scrape bloody and damage happens.

Finally I grab the wire cutter, cut through the conduit. This means that the conduit will now have to be replaced through the wall, a lot more work later. Fuck it.

Loosten the bolts, tie the can to the bucket (there's no good way to secure it), undo the last bolt. As soon as the bucket moves the letter slips and falls two feet, crashing and banging, the rope catching it.

The manager has been watching, kind of wincing. I'd yelled to him "Forty-five pounds, eh?" after the first one was down. He asked, "Was the glass broken already?" and I said, "No — that happened after it came crashing against the bucket." I'm pissed at this guy, and I'm even madder at myself for getting talked into it. With no end in sight.

He helps me load the two letters in the car, and in the course of doing that the as-yet unbroken glass of the second letter shatters, tiny mercury beads scattering all over the back of the station wagon.

Back at the shop I pull out a scale: 85 pounds, what with 60ma transformers inside. And the neon is 13mm BL3500 (just what I have a lot of), each tube with over 18 feet of glass in it.

LATER: When I got home I knew one thing for certain: I wasn't going back up. I didn't care if it meant losing the cash, or losing my reputation — no way.

So I called some neon friends, guys that live elsewhere, and asked them what they'd do. One friend pointed out that I didn't make the sign in the first place, so I wasn't responsible for the problems that it had, and that if I fixed the letters and brought them back I could still probably collect on my work and the crane rental.

They said I wasn't bound by any early estimates for the repair: "Hey, you got up there, found out there were problems beyond your earlier estimate, and so you just get a change order. That's all it is. Just tell him you have to do a change order on this." Nice term, that.

I called the store manager back, told him that I needed him to authorize a crane to lift the letters back up, in addition to one for myself. He said that he couldn't authorize that, that the other electricians had pulled the letters down and put them back using just ladders. I said "Perhaps then you could get them to put them back up" — and he said he would. (Nearly two months later he hasn't yet.)

And we even got paid.

There are several morals to this story. One is to call someone for advice before you go nuts; I felt A LOT BETTER and learned some important things... another is that you can redraw bids rendered irrelevant by a drastic shift in circumstances... yet another is that when someone wants a big, high sign repaired, give them a bid just for showing up and looking at it, not for a mystery repair job.

But the most important lesson is that misery is a very good teacher. NOTHING IS GETTING ME UP IN A BUCKET EVER AGAIN.

The Neon News is published quarterly by Ted Pirsig and Val Crawford, P.O. Box 668, Volcano, Hawaii, 96785. (808) 967-7648. Subscriptions are $15/year U.S., $17/year Canada, and $19/year foreign, payable in U.S. currency. Single issue price: $4.00 No advertising (other than classifieds, at $.25 per word) is accepted. The Neon News welcomes stories, artwork, photographs, letters, ideas, suggestions, irate comments and old transformers. The editors make no pretense to be experts in the field; the newsletter is intended as a forum where neon folks can exchange ideas and information.

# BULLETIN BOARD

**NEON SIGN COLOR POSTCARDS:** Pontiac Indian, Buster Brown, Mobilgas Flying Horse, Simple Simon, etc. Fifty cards for $13.50. Davidson, 860 North 26th Street, Philadelphia PA 19130. (215) 232-0478

**More survey results:** On the question of offending readers, one Scottsdale subscriber advised us to "try harder please!" Another reader in Amarillo TX scrawled an ambiguous review: "You're milking this heifer."

**Fred Caplan** of Hamden CT wants "to see different neon prices for footage around the U.S."

**Mark Miller** of Tempe AZ wants to know more about mercury stains at the bends of powder-blue tubes.

*<This is a frequent query; the most consistent explanation I've heard is that the chemical used to create the blue (and some shades of white), calcium tungstate, breaks down in the high heat of bending. This leaves tungsten in the tube, which combines with the mercury and produces a stain.*

*The solutions I've heard are many — try different brands of electrodes and/or different pumping techniques; alter your bending technique so that the glass doesn't get as hot. When Larry Graham of Tempe AZ visited our shop last month, he said that at a neon seminar EGL's Frank Cortese Sr. said that if you really want to avoid mercury staining, flush the tube thoroughly with water before welding the electrodes on. He gave as an example the Miller High Life beer signs; using that technique, their fabricator never has any problems with staining.>*

**Gary Burke** of St. Louis MO wants articles on "filling pressures for radio frequency transformers; also a good source for an inexpensive r/f that is reliable. (And a) survey among subscribers on success rates of transformers like the Tech 2000 or Dynamic 3700. Also cover mercury vapor injection as opposed to the dumping of mercury into tubes" and mercury staining. Gary says he's happy with his B&B transformer and Chokemaster...

**Studio One Neon** in Santa Fe NM wants advice on collecting delinquent bills. *<Threaten them with taking down the neon, or wave your pea-shooter at the sign — it works for us. Standard practice for many companies is to get half down, and tell customers in advance that you expect the other half on completion; do not wait to bill later.>*

**Waller Sign Co.** of Huron OH wants an article comparing electrode brands on price, quality and other differences.

**Marian Polan** of Northbrook IL said that what she would like to see in the newsletter is CASH.

"Mad scientist" **Joseph Keller** of Neon City in Northport AL says he has been wondering about the following:

"How do you manufacture a `crackle tube'?

"Are all those little 12,000/30 shocks and 20,000khz frequencies from electronic transformers slowly mutating us into something that wasn't meant to be upon this earth?

"Does anyone else get a dull, blank stare from someone when you tell them that you are a neon artist/tubebender until you finally say very, very slowly `I MAKE THE STUFF BEER SIGNS ARE MADE OF!!!' only to hear them say `OOOOOOhhh, I see,' while giving you a sympathetic look?

"In light of working with 15,000-volt bombarders, poisonous mercury, hot molten glass, open flames and the multitudes of burns, cuts and singed hair that we encounter, are we a chosen race of artisans or just a bunch of crazy people?"

**Phil Baker** adds these questions: "Is there a reliable tube temperature gauge to use in bombarding, and where can you get one?

"What's the best range of bombarding current to use? I've tried it hard and fast (500+ milliamps) and slow (200 milliamps) and can't figure out what's best. Hard and fast gives you hot tubes but the electrodes don't get hot enough. Slow gives you good hot electrodes but the glass doesn't get hot enough.

"What the hell is snaking and is there anything to stop it short of suicide?

"What is the best way to store and dispense mercury into tubes? I use a bottle with a hypodermic needle on it but can't prevent oxidation (from contact with air) and can't get a consistent charge of mercury. Do you have to put extra mercury into a tube to be burned by an electronic transformer?"

*<Yes, according to a recent bulletin put out by Neon Dynamics and passed our way by Max Marketing: "Mercury migration is characterized by a very slow dimming at one end of the mercury/argon pumped tube and may progress slowly further up the tube. This dimming is caused by the metal, mercury, migrating to one end*

**(see Bulletin board, page 12)**

THE NEON NEWS

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